TACOM
Mobility and Firepower
for America's Army

Crewman's Associate Advanced Technology Demonstrator Briefing

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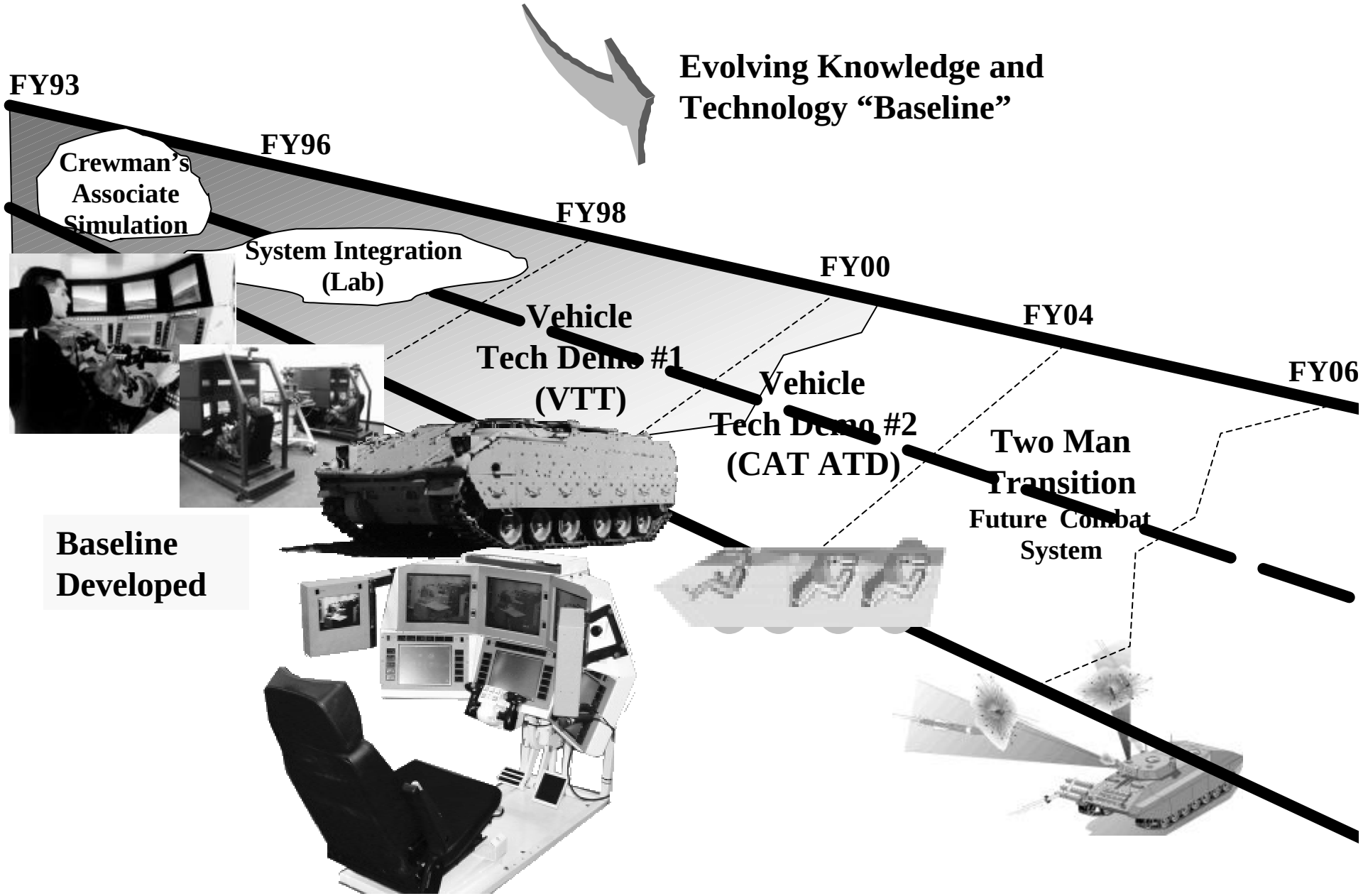
UNCLASSIFIED

TARDEC Crew Reduction Efforts



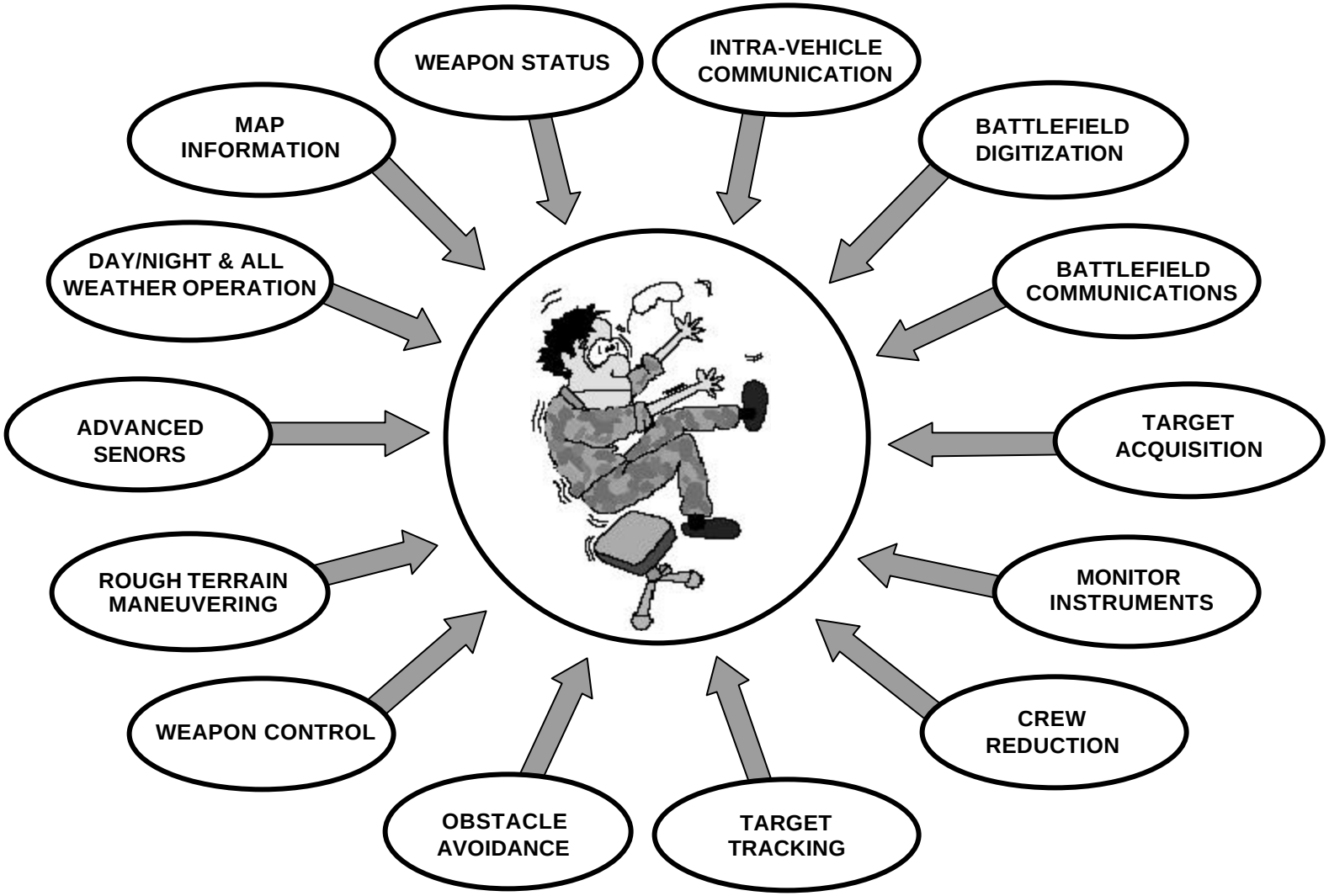
Crewman's Associate ATD

- The development of a crew station soldier-machine interface

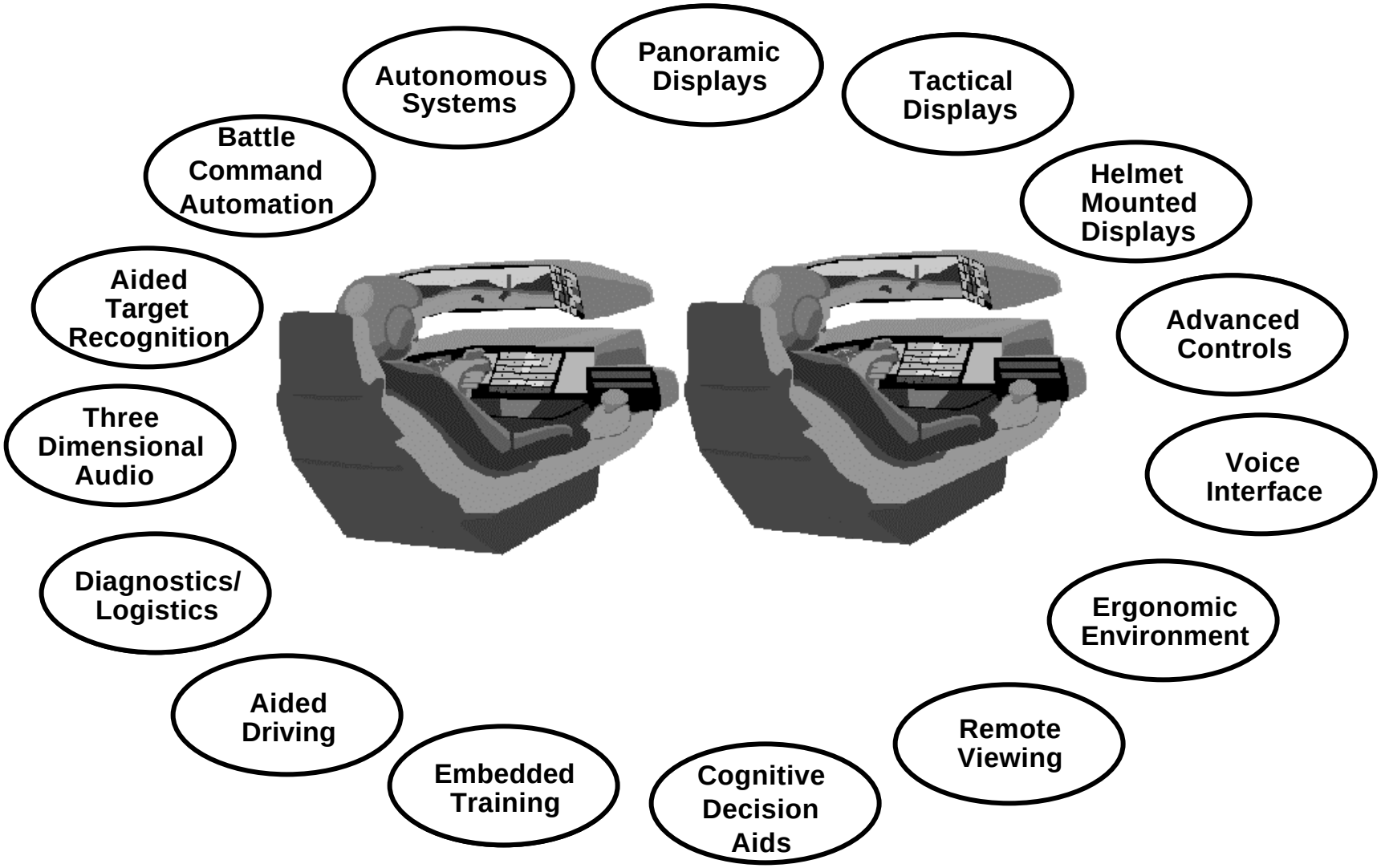
- The integration of advanced technologies, such as aided target acquisition, integrated defense, combat ID, digital messaging, driver's aids, etc.

- Two platforms (time frames) addressed:
  - Potential M1A2 (SEP) + (*1998 technology)*
  - Future MBT *(2005 technology)*

Motivation


WEAPON STATUS
INTRA-VEHICLE COMMUNICATION
MAP INFORMATION
BATTLEFIELD DIGITIZATION
DAY/NIGHT & ALL WEATHER OPERATION
BATTLEFIELD COMMUNICATIONS
ADVANCED SENORS
TARGET ACQUISITION
ROUGH TERRAIN MANEUVERING
MONITOR INSTRUMENTS
WEAPON CONTROL
CREW REDUCTION
OBSTACLE AVOIDANCE
TARGET TRACKING

Vision

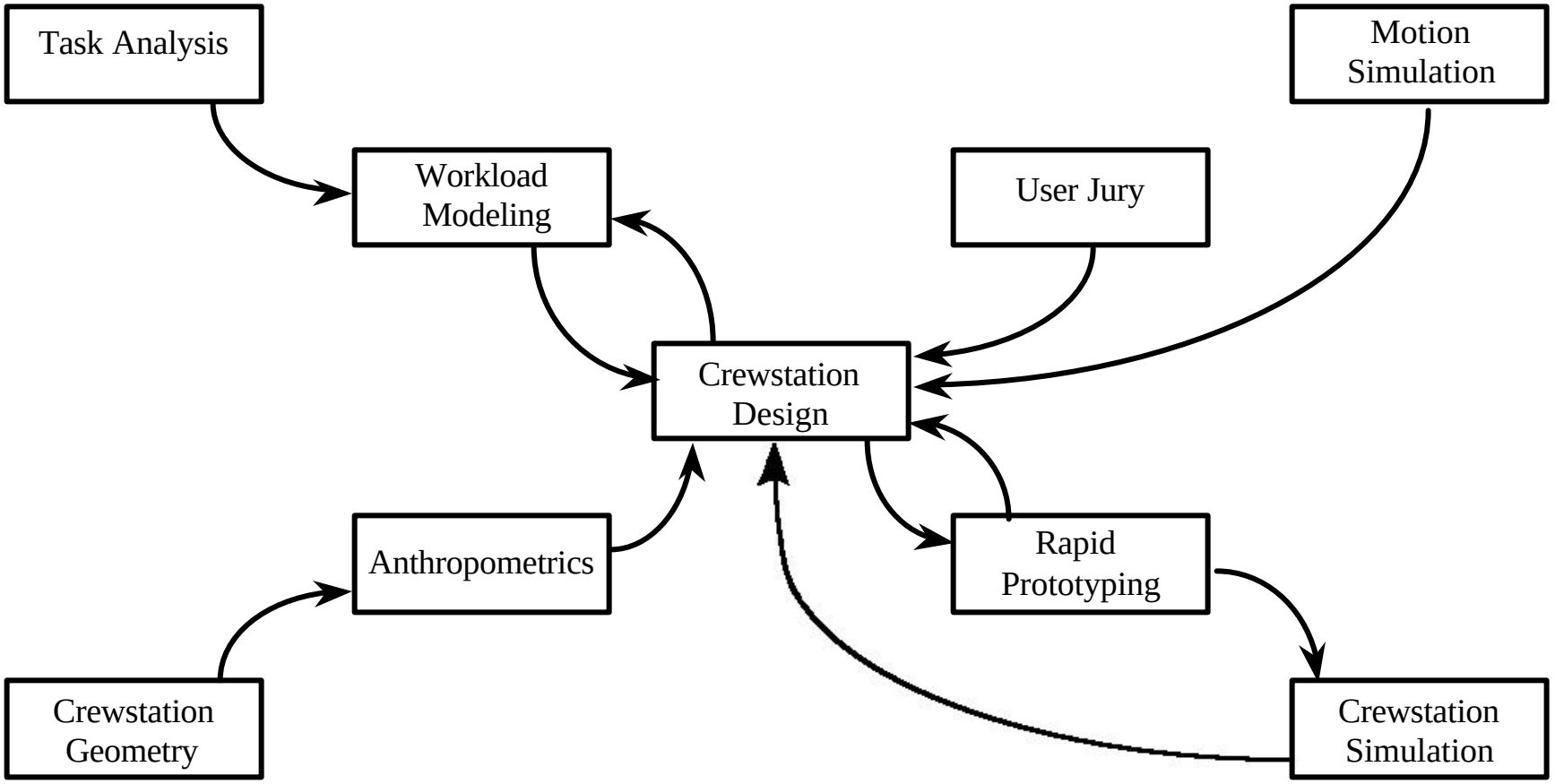

Autonomous Systems
Panoramic Displays
Tactical Displays
Battle Command Automation
Helmet Mounted Displays
Aided Target Recognition
Advanced Controls
Three Dimensional Audio
Voice Interface
Diagnostics/ Logistics
Ergonomic Environment
Aided Driving
Remote Viewing
Embedded Training
Cognitive Decision Aids

Objectives

Increase Main Battle Tank operational effectiveness by:

- Decreasing engagement timelines
- Decreasing time required to create and send digital C2 reports
- Improving operations on the move
- Improving situational awareness
- Improving night operations
- Providing a User-friendly interface to the digital battlefield of Force XXI
- Improving CONOPs
- Reducing maneuver damage

CTT Design Methodology

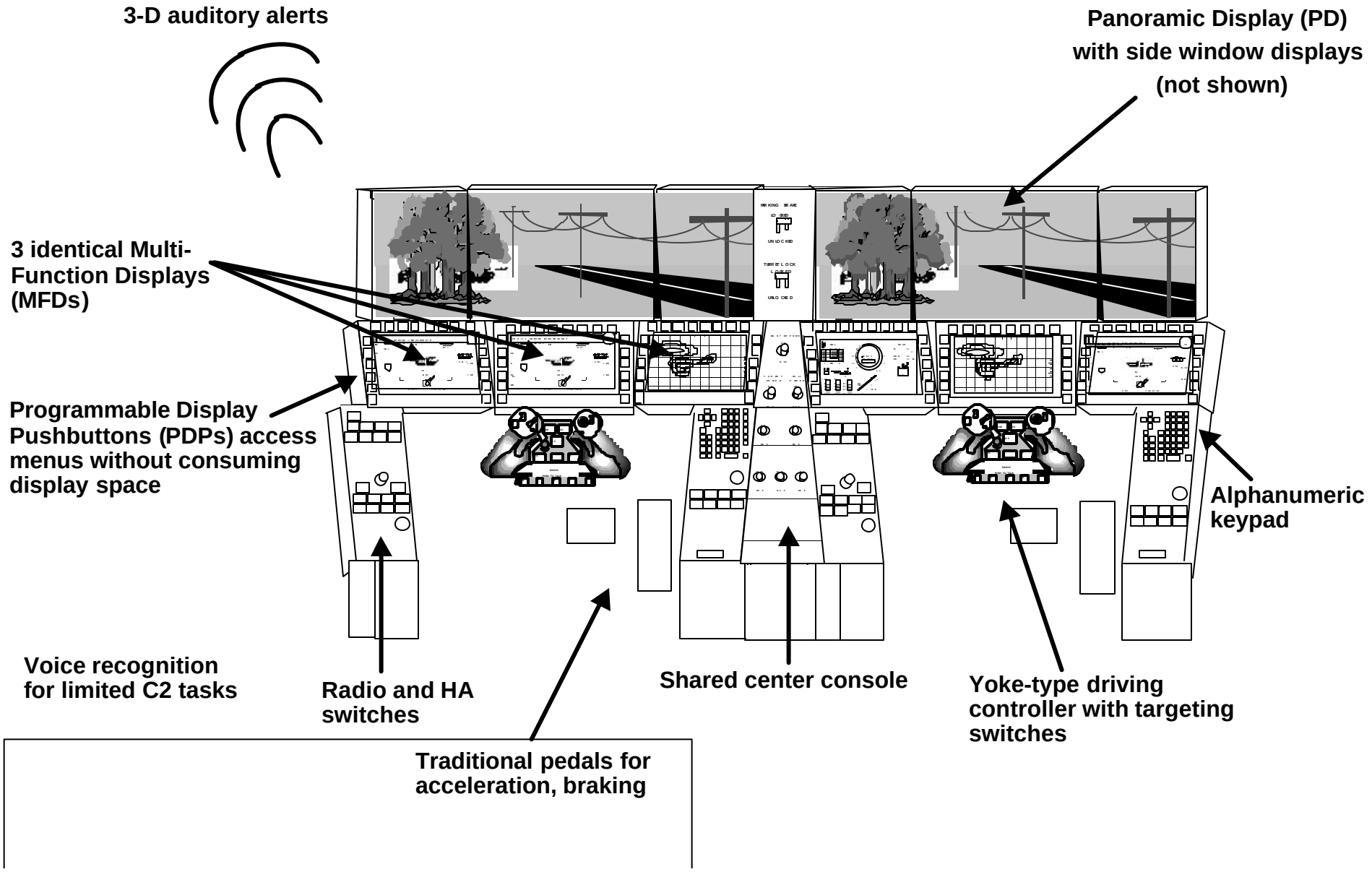


Individual Steps or Complete Design Process Performed to Meet Project Goals

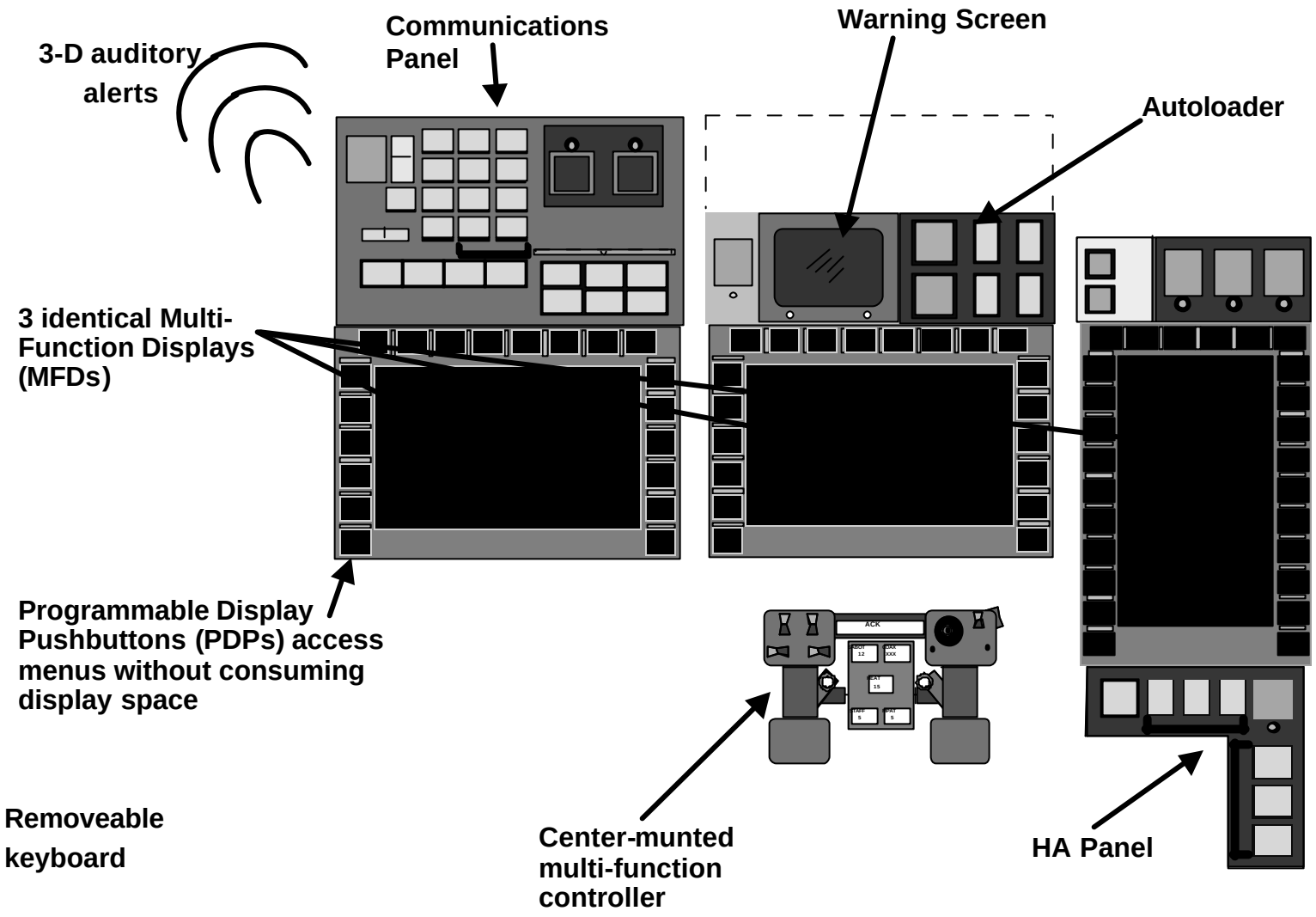
Crewstation Design Principles (Primary)

- Hands on primary controller
- All critical information in the primary vision zone
- One step functions
- Consistent Mental Model

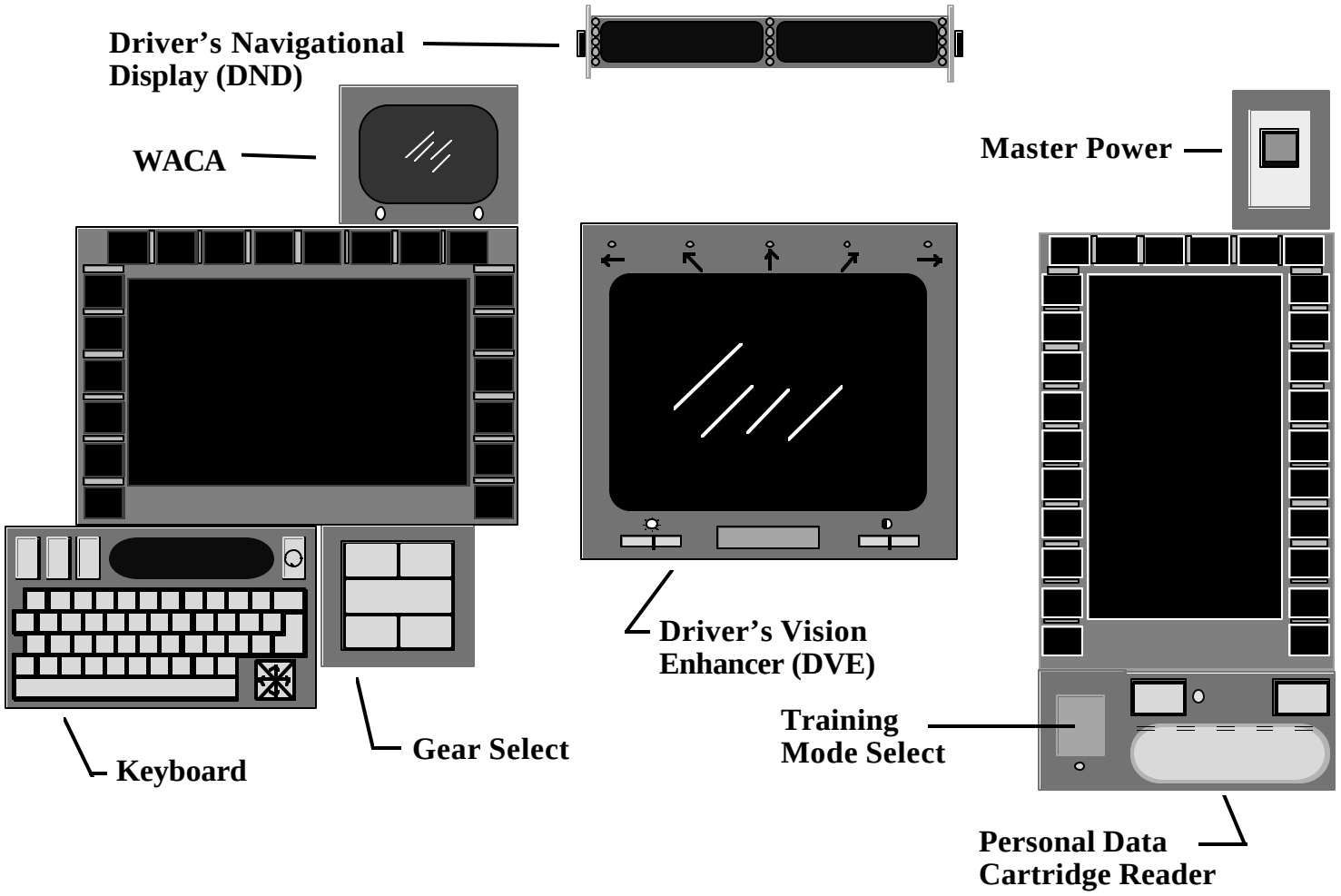
2005 Crewstation



1998 Crewstation



1998 Driving Station



Crewstation Displays

Panoramic Display

- 180 degree indirect vision to the crew
- Inherent protection from directed energy weapons
- Seamless, closed hatch vision
- Common visual environment
- Located within the Primary Vision Zone.

Crewstation Displays

Multifunction Displays

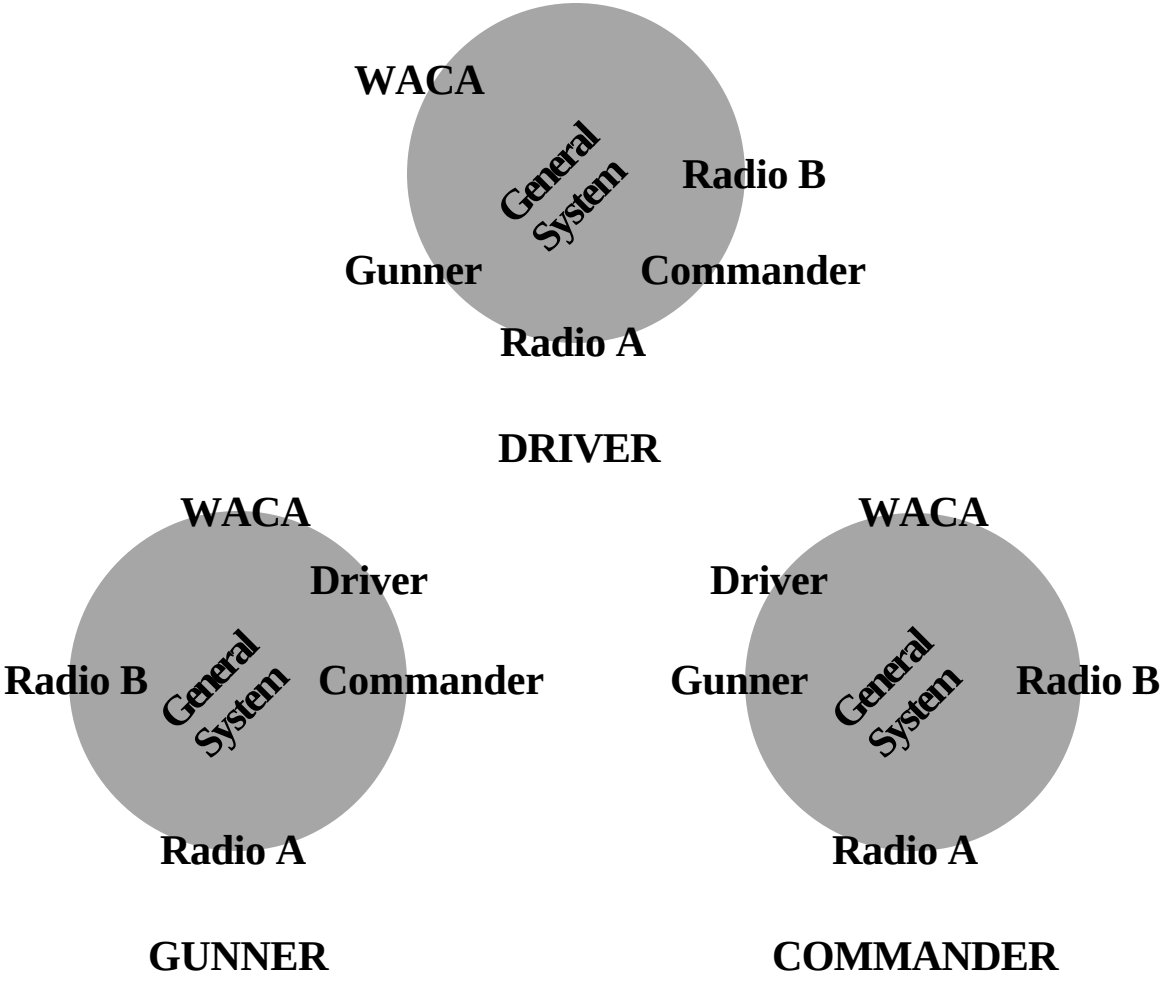
- Display information from different subsystems: targeting, driving, command and control, tactical map, etc.

- Buttons on the top of the MFD select the displays functionality.

- Located within the Primary Vision Zone.

- Provide consistent mental model.

3D Audio Display



- **A User-friendly interface to the digital battlefield of Force XXI**
- **A 65% decrease in the workload required to send C2 messages**
- **Improved situational awareness**
- **Improved operations on the move**
- **Improved night operations**
- **Reduced maneuver damage**
- **Improved CONOPs**

Test Results
(Non-experimental analysis)

- Operations on the move have been improved due to:
  1) decreased steps required to execute tasks
  2) elimination of dragging the cursor
  3) all critical task on yoke

- The crewmen now have a simplified, User-friendly interface to the digitized battlefield of Force XXI.

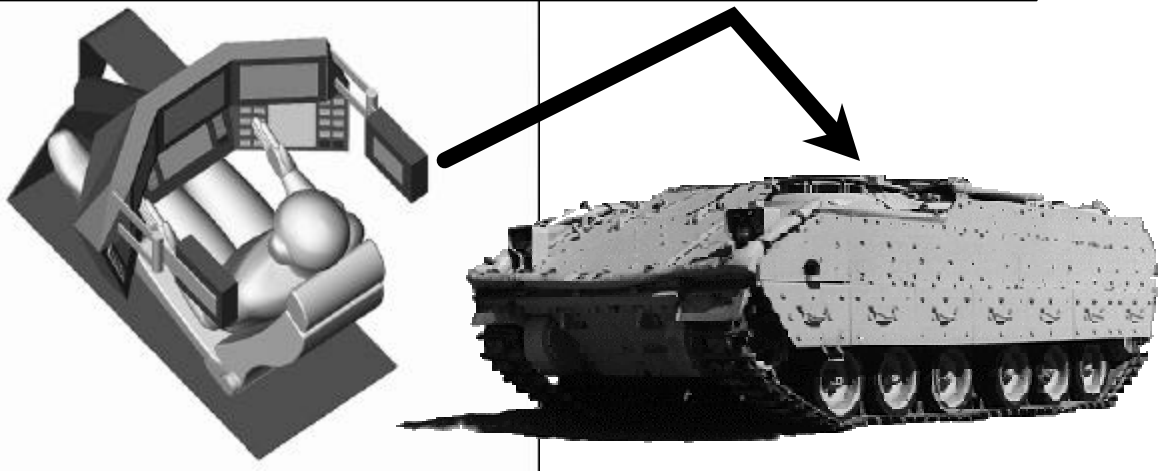
- The ability to effectively perform continuous operations has been improved due to the decreased fatigue associated with operating this crew station.

Test Results
(Subjective Comments)

- The electronic map provided the most significant performance enhancement
- The ability for each crewman to tailor his individual displays to suit his preferences was helpful
- Digital C2 interface had a positive impact on performance, being easier and faster than M1A2
- Aided target acquisition had a positive impact on performance.
- *Combined interfaces and technologies provided the ability to rapidly convey the information required to control forces at the platoon and company level*

Vetronics Technology Testbed (VTT)

- **Update Crewman's Associate Crew Station Design**
  - Lessons Learned
  - Technology Advances
  - Test Bed Costs
  - Test Bed Space
- **Integrate into Bradley A0 Hull**
  - Two Crew Stations
  - Supporting Technology
  - Supporting Subsystems



- **Conduct Test Bed Workload Experiments and Technology Demonstrations in the Field**
  - Side-By-Side
  - In-Line